

Argonne Nuclear Data Program

□ Nuclear Data **Compilations & Evaluations**

- nuclear structure compilations and evaluations - ENSDF & XUNDL
- evaluation of atomic masses (AME) and other nuclear physics properties (NuBase)
- decay data evaluations in support of IAEA-led projects & other topical evaluations (nuclear isomers, B(E3), single-particle structures of deformed nuclei & SHE, ND for monitoring applications and FPY, medical isotopes application & others)

□ Complementary ND **Research** Activities

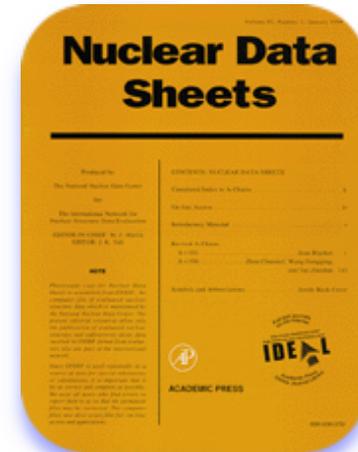
- intersections between basic and applied nuclear physics & astrophysics - via collaborative agreements with a little or no cost to USNDP
- contributions to DOE/SC/NP FOA's - 2 funded in FY17 & 1 in FY19

Evaluations & Compilations - FY2020

ENSDF

18 mass chains assigned to ANL

- **A=205** was completed and published in *NDS*
- **A=203** was completed and submitted to NNDC on May 20, 2020 - still under a review?
- started working on **A=201** - will be completed in FY2021
- reviewed **A=190** (completed)



XUNDL

- no requests for compilations during FY2020
- discontinued collaboration with RIKEN

AME & NUBASE

- continued compilation & evaluation activities - work on the new tables is near completion (presentation by F.G.Kondev)

IAEA-NDS collaborations

- IAEA-led project on ND for monitoring applications - presentation by IAEA
- IAEA-CRP on FPY - Tovesson, Savard & Kondev (presentation by G. Savard)



Nuclear Data Research Activities

intersections between basic and applied NP & astrophysics

- complements and benefits the evaluation activities
- sought after collaborator with little or no cost to USNDP

- ❑ at **ANL (ATLAS & CARIBU)** - nuclei far from stability, spectroscopy of heavy and super-heavy nuclei, K-isomers, beta-decay spectroscopy & mass measurements in the FP region; *decay spectroscopy* of actinide nuclei and nuclei of importance to applications of medical isotopes and metrology; **FOA's** funded projects
- ❑ at **MSU** (Coulex & decay spectroscopy) & **RIKEN** (decay spectroscopy) **GSI/ILIMA** (isomers & masses)- properties of neutron-rich nuclei far from the line of stability

Contributions to FOA's funded projects

Objective

Significantly improve Nuclear Data in the Fission Product region - cross-cutting overlap with the main ND stakeholders **DOE-SC/NP** (Nuclear Structure & Astrophysics) & **DOE-NNSA/NA-22** (applications)

- ❑ Improving the Nuclear Data on Fission Product Decays at CARIBU (PI: G. Savard)
 - ✓ 5 years project - collaboration between ANL and LLNL - funded by **DOE/SC/NP (ANL)** and **NNSA/NA-22 (LLNL)**
- ❑ Novel Approach for Improving Antineutrino Spectra Predictions for Nonproliferation Applications (PI: F.G. Kondev)
 - ✓ 3+2 years project - funded by **DOE/SC/NP** and **NNSA/NA-22**
- ❑ Fission product yield measurements using ^{252}Cf spontaneous fission and neutron-induced fission on actinide targets at CARIBU (PI: G. Savard)
 - ✓ 5 years project - collaboration between ANL and LLNL - funded by **DOE/SC/NP (ANL)** and funding is expected to LLNL by **NNSA/NA-22**

presentation by G. Savard

Future Plans (FY2021 and beyond)

- ❑ Continue contributing to *ENSDF* & XUNDL - top priority - closer connections with ATLAS & FRIB user communities
- ❑ Continue *AME* & *NuBase* collaboration activities
 - maintain the currency (4-5 yrs cycle) and quality
- ❑ Continue collaborations with IAEA-NDS, other USNDP groups & broader nuclear physics community on ND *topical evaluations* - B(E3) evaluation update (with T. Kibedi, ANU) and properties of heavy and SHE nuclei (masses, decay properties, isomers)
- ❑ Continue *research activities* with emphasis on nuclear structure physics and astrophysics, and their intersection with the applied nuclear physics
 - **ATLAS & CARIBU**: nuclear structure, masses & astrophysics, with emphasis on properties of neutron-rich nuclei in the deformed, light rare-earth region (A~160)
 - ▶ **N=126 factory**: the heavy region south of ^{208}Pb - overlaps with the ND evaluation responsibilities
 - ▶ **nuCARIBU**: contributions to FOA's and other interagency ND projects
 - **MSU (FRIB), RIKEN, GSI (ILIMA) & IMP (HIAF)** - nuclear structure, masses & astrophysics & and intersections with the applied programs

Publications & Invited talks - FY2020

- Publications in refereed journals: 16
- Invited talks: 5

Personnel & Effort - FY2020

- base ND program
 - ✓ 1 head (staff) - 0.80 FTE SC/NP/ND
 - ✓ 0.20 FTE (FOA funding from NNSA/NA-22 & SC/NP)
 - will expire at the end of FY2022